

Project Relevance

The BMX frame, well esteemed for its structural integrity, generally lacks amenability to motorized applications due to dimensional constraints. However, the unique design of the 2 stroke engine in conjunction with a standard pumper carburetor affords a unique opportunity in which the engine configuration can be turned upside down to sit within the toptube and downtube. In this way, the engine maintains its functionality and can be mounted mid-frame, the conventional mounting arrangement seen with larger bikes. This project encompasses the development of a toptube bracket mount upon which the engine is affixed, as well as auxiliary supporting elements. The entire protocol has been designed to balance aesthetics with feasibility, and seeks to minimize the modification effort demanded by custom builds as the mount can be machine or printed upon request. The final goal is to furnish a well-functioning CNC milled or 3D printed component that could serve as an essential component to a low-cost motorized BMX bike build kit.

Methods

Design prototyping commenced in September of 2020. BMX dimensions and engine features were measured using a 6" caliper. The information was subsequently characterized into a series of 3D models (created in Autodesk Fusion 360) and adjusted accordingly to fit the specifications of the standard BMX toptube as well as the standard pocket bike bolt pattern.

Image 1 presents the default 3D render view in Autodesk as well as all orthographic views of the mount.

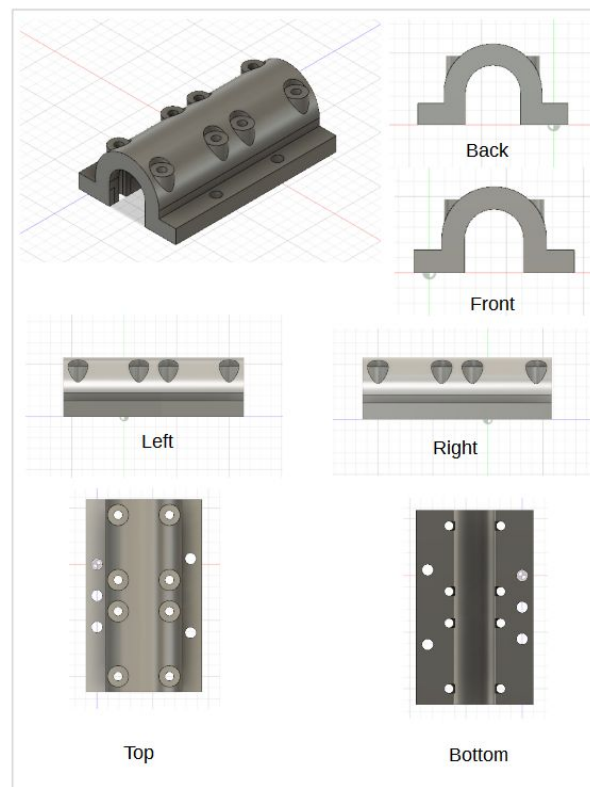


Image 1: Views of Toptube mount.

Design Considerations

The mount is designed to be an affordable yet effective single piece to be fixed using four 1.5" x U-bolts with $\frac{1}{4}$ " thread diameter and 8 hex nuts (washers are optional, but recommended). Standard BMX top tube diameter is 1.25", and the addition of .125" neoprene rubber padding expands the tube diameter to fit in contact with the U-bolts, developing a compression effect to fasten the mount into position. The padding also provides a degree of shock resistivity through the inherent absorptive qualities of neoprene rubber. The mount opens at the bottom to prevent any obstruction of the rear brake line boss and cable. Please reference **Image 2** for a rudimentary mounting setup of the bracket on the toptube over the neoprene rubber layer.

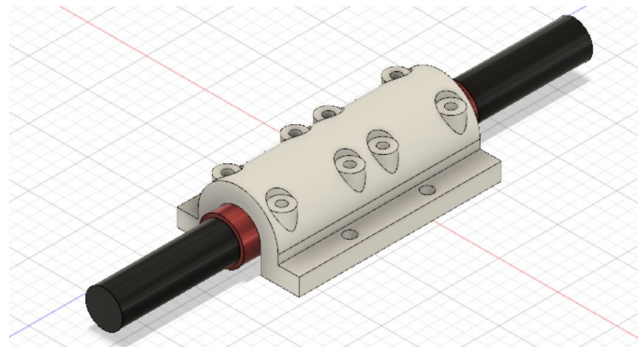


Image 2: Basic setup of bracket (white) on neoprene rubber layer (red) and toptube (black)

Upcoming Developments

Future renditions of the model will allow for alternate U-bolt sizes as well as several upper fastening options in addition to hex nuts. This is primarily for aesthetic appeal and variance, although functionality and structural integrity is invariably a priority in all endeavors.